Journal of the Formosan Medical Association (2013) 112, 208–215

Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.jfma-online.com

ORIGINAL ARTICLE

Psychopathology, rehospitalization and quality of life among patients with schizophrenia under home care case management in Taiwan

Li-Ren Chang [a], Yu-Hsuan Lin [a,b], Hung-Chieh Wu Chang [a], Ying-Zai Chen [a], Wei-Lieh Huang [a], Chih-Min Liu [b,c], Chen-Chung Liu [b,c,*], Hai-Gwo Hwu [b,c]

[a] *Department of Psychiatry, National Taiwan University Hospital, Yun-Lin Branch, Yunlin, Taiwan*
[b] *Department of Psychiatry, National Taiwan University Hospital, Taipei, Taiwan*
[c] *Department of Psychiatry, College of Medicine, National Taiwan University, Taipei, Taiwan*

Received 29 September 2011; received in revised form 12 January 2012; accepted 31 January 2012

KEYWORDS
EQ-5D;
nonintensive case management;
quality of life;
rehospitalization;
schizophrenia

Background/Purpose: To study the outcome of a group of patients with schizophrenia receiving community home care case management programs by delineating the relationship among their psychopathology, rehospitalization rates and health-related quality of life (HRQoL).
Methods: This is a cross-sectional study on HRQoL, functioning and associating factors and a retrospectivehistorical control study by comparing the frequency and duration of rehospitalization in a sample of 60 patients with schizophrenia under nonintensive case management (non-ICM) in Taiwan. All participants were assessed on the Positive and Negative Syndrome Scale for Schizophrenia (PANSS) for psychopathology, on EuroQoL-5D (EQ-5D) and EQ visual analogue (EQ-VAS) for HRQoL, andGlobal Assessment of Functioning (GAF) for socio-occupational dysfunction. Other clinical characteristics are also gathered.
Results: Patients with schizophrenia treated with non-ICM had a significant reduction in admission frequency (-0.10 ± 0.36 times per year, $p = 0.042$) and length of inpatient stay (-27.8 ± 78.0 days per year, $p = 0.008$). Better EQ-5D and EQ-VAS are significantly associated with lower general psychopathology score, while better EQ-VAS is significantly associated with older age and higher negative symptoms subscale score. GAF is negatively associated with higher positive symptoms and negative symptoms subscale scores, while positively correlated with a greater reduction in number and frequency of admission.
Conclusion: Non-ICM can help to decrease rehospitalization of home care patients. HRQoL and functioning can be assessed by the three perspectives we used, and each measure was

* Corresponding author. Department of Psychiatry, National Taiwan University Hospital, 7 Chung Shan South Road, Taipei 10002, Taiwan.
E-mail address: chchliu@ntu.edu.tw (C.-C. Liu).

doi:10.1016/j.jfma.2012.01.018

correlated to different dimensions of patient psychopathology. It will be better if we include baseline and post-intervention PANSS scores, HRQoL and functioning as outcome indicators.

Introduction

Schizophrenia is a chronic, debilitating mental disorder that affects approximately 1% of the general population[1] and causes impairments in patient functioning, such as self-care, interpersonal relationships, and occupational skills.[2–4] Health-related quality of life (HRQoL),[5] an outcome measurement obtained by a self-report of physical, emotional, mental and functional wellbeing,[6] has been applied to patients with schizophrenia[7,8] and they showed lower HRQoL compared to the general population.[9–11] Determinants associated with worse HRQoL for patients with schizophrenia included younger age of onset,[12,13] positive symptoms,[2,14,15] anxiety,[14–17] depression,[14–16,18,19] general psychopathology,[15,20,21] negative syndrome,[2,15,20,21] and neurocognitive deficits.[2] Factors associated with better HRQoL included older age,[22] and use of second-generation antipsychotics.[23] However, there are also studies showing no relation between positive,[20,21,24,25] negative[25] or depressive[24] symptoms and HRQoL. These conflicting results are attributable to patient selection, sample size, study design, characteristics of settings and different measures.[26]

Past studies regarding HRQoL among patients with schizophrenia focus on outpatient clinic, inpatients or an unspecified population.[2,21,22,26] Relatively few studies have examined HRQoL of patients with schizophrenia receiving community home visit programs.[10,11,27] Lempp and colleagues recruited people with schizophrenia treated by community psychiatric teams in four sites in Europe. They found that patients with schizophrenia had impaired HRQoL, measured by the short form health survey (SF-36), in physical and mental domains compared to the general population. However, they did not evaluate schizophrenia treatment course or symptom severity.[10] Malakouti and colleagues recruited individuals with schizophrenia receiving home visit services. After 12 months of case management, patients had significant improvement in HRQoL measured by the Wisconsin Quality of Life system, as well as reduced admission times. However, they focused on clinical outcomes and did not analyze the association between quality of life and clinical characteristics.[27] According to the 2011 Cochrane review, either assertive community treatment (ACT) or case management (CM) providing care at home or places of work, an assertive outreach, multidisciplinary team with a caseload of no more than 20 patients is defined as intensive case management (ICM).[28] Both studies employed the ICM model, while theevidence regarding HRQoL and its determinants among patients with schizophrenia treated with a non-ICM model (CM with a caseload of over 20 people) remains limited.[11]

ICM or non-ICM is usually indicated for schizophrenia patients who have poor drug compliance, frequent relapses or repeated hospitalization.Compared with standard care, ICM is associated with shorter stays in hospital and works best for frequently hospitalized patients.[28,29] Non-ICM is different from ICM in that it has a caseload of over 20 people. It is likely to be a common practice in places where limited expenditure has been allocated to community care. However, no study has examined the impact of non-ICM.[28]In Taiwan, previously many schizophrenia patients tended to be repeatedly hospitalized in acute or chronic ward settings instead of returning to their communities. Recently implementation of home treatment programs was encouraged by the Department of Health as a tertiary care model, especially in areas that are not resourceful in mental healthcare. In this study, we examine associations among clinical outcomes and HRQoL in a sample of 60 patients with schizophrenia treated with non-ICM in Taiwan. We hypothesized that, first, schizophrenia patients treated with non-ICM have significant clinical improvements, as indicated by a reduction in need for hospitalization; second, better quality of life and functioning are associated with less severe psychopathology and fewer rehospitalization after receiving non-ICM.

Materials and methods

Study design

This study was carried out in the Department of Psychiatry, Yun-Lin Branch of National Taiwan University Hospital (NTUH) in Taiwan. The study was approved by a Human Subjects Review Committee of NTUH. Yun-Lin is an agricultural county with a population of 723,700 located in the western part of Taiwan. Yun-Lin Branch of NTUH is one of the few local hospitals providing medical support to this relatively less resourceful county.The non-intensive case management (non-ICM) program of the hospital consists of a multidisciplinary team including trained psychiatrists, psychiatric nurses, and social workers. It is indicated for chronic psychotic patients who have poor drug compliance, frequent relapses or repeated hospitalization. We provide two face-to-face sessions per month at home or in places of work to evaluate clinical symptoms, adverse drug reactions and social functioning, to check medication compliance, to engage uncooperative clients, to offer the patient and their family psycho-education and counseling, as well as to remind them of our regular service hours, telephone numbers and the 24-hour emergency coverage provided by the hospital.

The study design is a combination of a cross-sectional assessment for quality of life and psychopathology and a retrospectivehistorical control study for comparing clinical improvement. A total of 130 patients with severe mental illness are currently enrolled in this non-ICM program. For this study, we only included participants

who met the following criteria: (a) DSM-IV diagnosis of schizophrenia; (b) absence of comorbid major depressive or manic episodes, mental retardation, organic brain syndrome, hypertension, diabetes mellitus, and other major systemic diseases; and (c) absence of alcohol abuse or any illicit substance use.In total 60 patients were eligible and all of them provided informed voluntary, written consent for us to collect their clinical data and be evaluated for current psychopathology, quality of life and socio-occupational functioning.

Measurement instruments

Positive and Negative Syndrome Scale (PANSS)

Severity of psychopathologic symptoms was evaluated with the Positive and Negative Syndrome Scale (PANSS) [30] by a board-certified psychiatrist (LRC). PANSS includes positive symptoms subscale score, negative symptoms subscale score, and general psychopathology score. It is a semi-structured interview based on information related to the past week, with 30 items on a one- to seven-point continuum. Higher scores reflect a greater severity of psychotic symptoms.

EuroQoL-5D (EQ-5D)

EuroQoL-5D (EQ-5D) is a self-reporting questionnaire measuring five dimensions of an individual's health state: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each dimension has three levels of severity, reflecting "no health problems", "moderate health problems", and "extreme health problems". The composite scores are then transformed to an EQ—5D time trade-off index (TTO) which is generated based on hypothetical trade-offs between length of life and symptoms. A TTO value of 1 means full health and a value of 0 means death. This index system has been validated in assessing and measuring the HRQoL of patients with schizophrenia.[31—33] We used a Chinese version of EQ—5D which has been validated in a nonschizophrenic population.[34] Patients were also asked to rate their health on the visual analogue scale (VAS), a vertical scale where one endpoint is labeled "Best imaginable health state" (indicating 100 points) and the other endpoint is labeled "Worst imaginable health state" (indicating 0 points).

Global Assessment of Functioning (GAF)

The objective evaluation of patients' overall socio-occupational functioning was based on the Global Assessment of Functioning (GAF) score, which was measured by the same psychiatrist.[1] The range of GAF score is between 0 and 100. A higher score means better functioning, while a lower score means poorer functioning.

Clinical improvement

The assessment of clinical improvement includes the number of admissions and the length of inpatient stay before and after receiving our case management program; that is from onset of schizophrenia to being enrolled in our non-ICM program and from enrollment to the date of study recruitment. We also calculated frequency of admissions (defined as number of psychiatric admissions per year), average length of inpatient stay (days of inpatient stay per year), and the difference between the number and frequency of admissions before and after receiving non-ICM, as well as the difference between total and average length of inpatient stay before and after receiving non-ICM.

Additional information

Demographic data (age, education, marital status), medical conditions [body mass index (BMI), waist circumference], current psychotropic medications (type of antipsychotics, total chlorpromazine equivalent dose, benzodiazepines, anticholinergics, β-blockers, antidepressants, mood stabilizers use), and Clinical Global Impression-Severity (CGI-S) were all collected.

Statistical analyses

All statistical tests were carried out using the SPSS version 15.0 for Windows (SPSS, Chicago, IL, USA). Descriptive statistics for the total sample were performed to categorize the patients in terms of clinical and psychosocial characteristics. Four clinical improvement variables (admission times, admission frequency, total length of inpatient stay, and average length of inpatient stay) before and after receiving non-ICM were compared by paired *t* test. We used Pearson correlation coefficients to examine the associations between HRQoL, functioning and other clinical characteristics. For categorical variables, such as gender, educational level, marriage, employment and medication, we treated patients as dummy variables taking on the values 1 and 0. Subsequently, multivariate stepwise regression analysis with stepwise method was performed to find out predictors of HRQoL and functioning. We treated EQ-TTO, EQ-VAS or GAF as dependent variables and put age, gender and PANSS subscale scores (positive symptoms subscale score, negative symptoms subscale score, and general psychopathology score) as independent variables. Statistical significance was assumed for $p < 0.05$. Values are expressed as means ± standard deviation (SD).

Results

Patient demographics, psychopathology, functioning and quality of life

The demographic and psychopathological characteristics of the participants are summarized in Table 1. Characteristically they were middle-aged (44.3 ± 9.9 years; range 23—64 years) with long duration of illness (20.0 ± 8.8 years; range 5—46 years) and had been enrolled in non-ICM for 41.5 ± 35.0 months. Most patients (76.7%) had education level at junior high school or below. Only 14 (23.3%) patients were married or cohabiting and nine (15%) were employed. Their average total PANSS score was 65.7.± 19.2. Their average GAF was 45.2 ± 7.1, EQ-TTO was 0.8 ± 0.2 and EQ-VAS was 66.7 ± 21.5.

Clinical features

The majority of our patients (71.7%) received a second-generation antipsychotic at a relatively low dosage

Table 1 Demographic and psychopathological characteristics of the study participants ($n = 60$).

Age (y)	44.3 ± 9.9
Gender	
Male	27 (45.0)
Female	33 (55.0)
Education	
College and above	2 (3.3)
Senior high school	12 (20.0)
Junior high school and below	46 (76.7)
Martial status	
Unmarried	27 (45.0)
Married or cohabiting	14 (23.3)
Divorced, separated, or widowed	19 (31.7)
Job	
Employed	9 (15)
Unemployed	51 (85)
Body mass index (kg/m^2)	26.3 ± 4.9
Onset of illness (y)	24.3 ± 7.3
Length of illness (y)	20.0 ± 8.8
Duration of non-ICM (mo)	41.5 ± 35.0
Psychiatric admissions	3.0 ± 3.3
Length of inpatient stay (d)	219.1 ± 311.0
Medication	
First-generation antipsychotic	17 (28.3)
Second-generation antipsychotic	43 (71.7)
Benzodiazepines	42 (70.0)
Anticholinergics	28 (46.7)
β-blockers	13 (21.7)
Antidepressants	8 (13.3)
Mood stabilizers	5 (8.3)
Antipsychotic dose (chlorpromazine equivalent dose) (mg/day)	267.8 ± 276.8
PANSS scores	
Positive symptoms subscale score	15.3 ± 5.0
Negative symptoms subscale score	19.7 ± 8.1
General psychopathology score	30.8 ± 9.1
Total score	65.7 ± 19.2
CGI-Severity Scale	4.3 ± 1.1
GAF	45.2 ± 7.1
EQ-TTO	0.8 ± 0.2
EQ-VAS	66.7 ± 21.5

Data are presented as mean ± SD or *n* (%).
CGI = Clinical Global Impression; GAF = Global Assessment of Functioning; non-ICM = nonintensive case management; PANSS = Positive and Negative Syndrome Scale; TTO = trade-off index; VAS = visual analogue.

(chlorpromazine equivalent dose 267.8 ± 276.8 mg/day) and tended to be overweight (BMI 26.3 ± 4.9 kg/m^2). Table 2 shows the differences in number of admissions, frequency of admissions (times per year), length of inpatient stay, and average length of inpatient stay (days per year) before and after enrolment in our case management program. All of these four indicators significantly decreased after receiving non-ICM.

Correlates of HRQoL and functioning

Participants' subjective HRQoL measured by EQ-TTO was negatively correlated with positive symptoms subscale score, negative symptoms subscale score, general psychopathology score, PANSS total scale, and CGI-Severity to a statistically significant extent, while EQ-VAS was positively correlated with age, BMI, and length of illness yet having no significant correlation with their clinical psychopathology (Table 3). Objectively participants' socio-occupational functioning measured by GAF was positively correlated with being employed, greater reduction in number of admission and frequency of admission, and negatively correlated with use of second-generation antipsychotic, antidepressants or mood stabilizers, and higher scores in all PANSS subscales, PANSS total scale, and CGI-Severity.

Multivariate regression analysis of HRQoL and functioning

Adjusting for age, gender and PANSS subscale scores, a multivariate linear regression with stepwise method was performed to explore effects of each independent variable on HRQoL and functioning. Table 4 shows that higher EQ-TTO is significantly associated with lower general psychopathology score ($p < 0.001$), while higher EQ-VAS is significantly associated with older age ($p = 0.01$), higher negative symptoms subscale score ($p = 0.03$) and negatively associated with general psychopathology score ($p = 0.001$). GAF is negatively associated with higher positive symptoms subscale scores ($p = 0.001$) and negative symptoms scores ($p = 0.011$).

Discussion

Our findings support the hypothesis that schizophrenia patients under nonintensive case management could gain significant clinical benefits, as indicated by reduction in the frequency of admission (times per year) and average length of annual inpatient stay (days per year) (Table 2). This is consistent with previous studies regarding either ICM or non-ICM programs.[27,28] Repeated hospitalization is one of the major indications for enrolment in case management programs. In countries with limited resources for providing ACT, case management provided by community mental health teams may support people with serious mental illnesses as effectively as ACT teams.[35] However, a decline in case load alone, such as ICM, does not improve outcome for severely psychotic patients[36,37] and ICM is less successful when inpatient use is already low.[29] In our study patients under this non-ICM saved about 4 weeks of hospitalization per year (Table 2), thus with regard to cost-effectiveness, instead of ACT and ICM, non-ICM seems to be a plausible alternative.

Also consistent with our expectation, better HRQoL and functioning is associated with the severity of psychopathology. Additionally we found that each of the three measures we employed is correlated to different dimensions of psychopathology. EQ-TTO, a subjective score to estimate from five dimensions (mobility, self-care, usual

Table 2 Comparisons of frequency and duration of inpatient stay: before and after non-ICM ($n = 60$).

	Before non-ICM	After non-ICM	Δ (After − Before)	t	p
Psychiatric admissions	2.57 ± 2.75	0.47 ± 1.23	−2.10 ± 2.67	6.101	0.000
Frequency of admissions (per year)	0.22 ± 0.26	0.13 ± 0.31	−0.10 ± 0.36	2.076	0.042
Duration of inpatient stay (d)	182.7 ± 278.1	36.4 ± 89.4	−146.3 ± 271.9	4.168	0.000
Annual inpatient time (d/year)	48.8 ± 65.0	21.0 ± 59.0	−27.8 ± 78.0	2.762	0.008

The duration of follow-up period before and after non-ICM was 192.0 ± 98.4 months and 41.5 ± 35.0 months, respectively. Data are presented as mean ± SD.
Non-ICM = non-intensive case management; Δ = difference.

activities, pain or discomfort, and anxiety or depression) of a patient's quality of life, is negatively correlated to all three dimensions in PANSS subscale scores (Table 3). Such an association between better EQ-TTO and lower general psychopathology score persisted when we examined by multivariate regression analysis (Table 4). Although another subjective rating by EQ-VAS did not show significant correlations by testing it alone (Table 3), and EQ-VAS also revealed such a negative association between quality of life and general psychopathology score in regression analyses (Table 4). These findings are consistent with previous results that general psychopathology is associated with poorer HRQoL.[15,20,21]

Interestingly, our results revealed that better EQ-VAS is associated with higher, rather than lower, negative symptoms subscale score, which seems to go contrary to previous findings that more negative symptoms are associated with a poorer quality of life.[2,15,20,21] One might argue

Table 3 Correlates of health-related quality of life and functioning ($n = 60$).

	EQ-TTO	EQ-VAS	GAF
Age	−0.165	**0.274***	−0.164
Gender (F = 0, M = 1)	0.076	0.127	0.090
Educational level (below junior high school = 0, above = 1)	0.117	−0.196	−0.012
Marriage (single, divorced, widowed = 0, married, cohabitating = 1)	−0.204	−0.105	0.033
Job (No = 0, Yes = 1)	0.184	0.054	**0.354****
Body mass index	0.041	**0.276***	0.016
Onset of illness	−0.192	0.058	0.020
Length of illness	−0.025	**0.259***	−0.201
Duration of home care	0.031	0.019	−0.198
Psychiatric admissions	−0.065	0.133	0.154
Length of inpatient stay	−0.228	0.065	0.069
Δ Psychiatric admissions	0.083	−0.096	**−0.470****
Δ Frequency of admissions	−0.024	−0.017	**−0.488****
Δ Length of inpatient stay	0.217	−0.057	−0229
Δ Average length of inpatient stay	0.088	−0.025	−0.101
Medication (No = 0, Yes = 1)			
Second-generation antipsychotics	0.031	0.040	**−0.295***
Benzodiazepines	−0.154	−0.069	−0.085
Anticholinergics	−0.091	−0.071	−0.143
β-blockers	−0.161	−0.052	−0.188
Antidepressants	0.105	0.003	**−0.292***
Mood stabilizers	**−0.425****	−0.073	**−0.304***
Antipsychotic dose (chlorpromazine equivalent dose)	−0.041	−0.037	−0.245
PANSS scores			
Positive symptoms subscale score	**−0.426****	−0.195	**−0.529****
Negative symptoms subscale score	**−0.331****	0.009	**−0.466****
General psychopathology score	**−0.581****	−0.256	**−0.405****
Total score	**−0.527****	−0.169	**−0.528****
CGI-Severity Scale	**−0.438****	−0.126	**−0.432****

* $p < 0.05$.
** $p < 0.01$.
CGI = Clinical Global Impression; GAF = Global Assessment of Functioning; non-ICM = nonintensive case management; PANSS = Positive and Negative Syndrome Scale; TTO = trade-off index; VAS = visual analogue; Δ = difference (after − before non-ICM).

Table 4 Stepwise linear regression with age, gender and PANSS scores predicting health-related quality of life and functioning ($n = 60$).

	Predictor	*B*	Adjusted R square value	F value	Significance	95% Confidence interval of *B*
EQ-TTO			0.326	29.543	<0.001	
	General psychopathology score	−0.015			<0.001	(−0.020, −0.009)
EQ-VAS			0.190	5.523	0.002	
	Age	0.690			0.010	(0.173, 1.207)
	General psychopathology score	−1.293			0.001	(−2.067, −0.518)
	Negative symptoms subscale score	0.956			0.030	(0.096, 1.817)
GAF			0.334	15.804	<0.001	
	Positive symptoms subscale score	−0.579			0.001	(−0.909, −0.250)
	Negative symptoms subscale score	−0.267			0.011	(−0.471, −0.062)

PANSS = Positive and Negative Syndrome Scale; TTO = trade-off index; VAS = visual analogue.

that EQ-VAS is an intuitive rating without much discretion and simply reflects a vague, subjective sense of well-being. Thus it is possible that patients with prominent negative symptoms are not aware of their lower-than-average mobility, self-care, usual activities etc, or their higher satisfaction of life quality is indeed revealing their lower motivation to change their current status. The positive correlations between EQ-VAS and older age, longer length of illness, as well as higher BMI provide indirect support to this inference (Table 3).

Similar to EQ-TTO, GAF is also negatively correlated to all three dimensions in PANSS subscale scores (Table 3). In contrast, lower GAF score is associated with higher positive and negative symptoms subscale scores, but not with general psychopathology scores, in multivariate regression analyses (Table 4). The presentation of delusion, hallucination or other disorganized behaviors, as well as negative symptoms may interfere with a patient's abilities to maintain self-care, interpersonal relations and occupational skills,[2–4] especially when the impact is measured objectively by GAF. Moreover, higher GAF is correlated to greater reduction in the number and frequency of admission, but the use of second-generation antipsychotic agents, antidepressants, and mood stabilizers are all correlated to lower GAF. It seems to suggest that if a patient needed to use these medications, they might have greater clinical severity and poorer functioning in this less resourceful county. It is not surprising at all that being employed is correlated to a higher GAF.

There were no relations between HRQoL, functioning and other clinical characteristics including educational level, marital status, onset of illness, length of illness, duration of non-ICM, or antipsychotic dose (chlorpromazine equivalent dose). Narvaez and colleagues also found that length of illness and antipsychotic dose (chlorpromazine equivalent dose) are not associated with HRQoL.[21]

The present study has some limitations. First, we did not include evaluation of neuro-cognitive functions, compliance to medication and adverse reactions, which might be confounding factors in HRQoL and functioning. Patient or caregiver recall about onset of disease, times of admission, and duration of admission in other psychiatric hospitals may be biased, which could result in information bias. Second, we excluded comorbid medical or psychiatric conditions that may interfere with the association between psychopathology, HRQoL and functioning, yet rendered a medium sample size not feasible for more statistical analyses. The strict process of exclusion may also cause a selection bias. The current sample might not be representative of schizophrenia patients receiving non-ICM in general. Third, the results of this non-ICM program could not be generalized to other community settings or inpatient population of schizophrenia. Fourth, EQ-5D is just one of the methods to assess HRQoL and may not be comparable to other measures. It does not include dimensions referring to social relationships, quality of success of the activities or social contacts, social skills performance and the like. Fifth, regarding rehospitalization, our before-and-after study design might exaggerate the impact of non-ICM intervention, as certain improvement could be attributable to concurrent changes in the society and general psychiatric service in Taiwan. Finally, our study design did not include comparison groups other than using historical controls. In the future, the inclusion of patient groups treated as regular outpatients or with other treatment modalities, such as chronic inpatients, or residents in halfway house, will be helpful to reveal the distinguishing features of home visit case management.

In conclusion, non-ICM is an important ingredient of a community mental healthcare system. Regardless of resourcefulness, it is believed to be necessary to hospital services in all areas.[38] Practically EQ-5D can be employed to assess the HRQoL of patients with schizophrenia easily in community settings, although its degree of validity is pending further study.[39] EQ-VAS is likely to be a minor complement to measure a patient's subjective feelings and should be interpreted with discretion. GAF gives a reasonable objective rating which is well correlated to reduction in rehospitalization, but not necessarily what the patients are most concerned about. To study the impact of a case management program or other psychosocial approaches as an adjunctive therapy to pharmacotherapy, such as cognitive behavioral therapy, social skills training, or supported employment, we suggest measuring from all three perspectives and to include baseline and postintervention psychopathology and HRQoL as outcome indicators.

Acknowledgments

This study was supported by a grant (NTUHYL.99N015) from the National Taiwan University Hospital, Yun-Lin Branch. The authors thank Dr Jung-Der Wang and Dr Hsin-Yi Lee for their kind suggestions about EQ-5D use.

References

1. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4th ed. Washington, DC: American Psychiatric Press; 2000. text revision.
2. Mohamed S, Rosenheck R, Swartz M, Stroup S, Lieberman JA, Keefe RS. Relationship of cognition and psychopathology to functional impairment in schizophrenia. *Am J Psychiatry* 2008; **165**:978—87.
3. Brissos S, Dias VV, Balanza-Martinez V, Carita AI, Figueira ML. Symptomatic remission in schizophrenia patients: relationship with social functioning, quality of life, and neurocognitive performance. *Schizophr Res* 2011;**129**:133—6.
4. Üçok A, Gorwood P, Karadayi G. Employment and its relationship with functionality and quality of life in patients with schizophrenia: EGOFORS Study. *Eur Psychiatry* 2011. doi: 10.1016/j.eurpsy.2011.01.014.
5. Lehman AF. Measures of quality of life among persons with severe and persistent mental disorders. *Soc Psychiatry Psychiatr Epidemiol* 1996;**31**:78—88.
6. Gill TM, Feinstein AR. A critical appraisal of the quality of quality-of-life measurements. *J Am Med Assoc* 1994;**272**:619—26.
7. Bobes J, Garcia-Portilla P, Saiz PA, Bascaran T, Bousono M. Quality of life measures in schizophrenia. *Eur Psychiatry* 2005; **20**(suppl. 3):S313—7.
8. Isaac M, Chand P, Murthy P. Schizophrenia outcome measures in the wider international community. *Br J Psychiatry* 2007; **50**(suppl.):s71—7.
9. Bobes J, Gonzalez MP. Quality of life in schizophrenia. In: Katschnig HFH, Sartorious N, editors. *Quality of life in mental disorders*. New York: John Wiley & Sons; 1997. p. 165—78.
10. Lempp H, Thornicroft G, Leese M, Fearns N, Graves H, Khoshaba B, et al. Implications of long-term conditions for both mental and physical health: comparison of rheumatoid arthritis and schizophrenia. *Qual Life Res* 2009;**18**:699—707.
11. Chang LR, Lin YH, Kuo TB, Wu Chang HC, Liu CM, Liu CC, et al. Autonomic modulation and health-related quality of life among schizophrenic patients treated with non-intensive case management. *PLoS One* 2011;**6**. e26378.
12. Patterson TL, Semple SJ, Shaw WS, Halpain M, Moscona S, Grant I, et al. Self-reported social functioning among older patients with schizophrenia. *Schizophr Res* 1997;**27**:199—210.
13. Sciolla A, Patterson TL, Wetherell JL, McAdams LA, Jeste DV. Functioning and well-being of middle-aged and older patients with schizophrenia: measurement with the 36-item short-form (SF-36) health survey. *Am J Geriatr Psychiatry* 2003;**11**: 629—37.
14. Chino B, Nemoto T, Fujii C, Mizuno M. Subjective assessments of the quality of life, well-being and self-efficacy in patients with schizophrenia. *Psychiatry Clin Neurosci* 2009;**63**:521—8.
15. Xiang YT, Weng YZ, Leung CM, Tang WK, Ungvari GS. Quality of life of Chinese schizophrenia outpatients in Hong Kong: relationship to sociodemographic factors and symptomatology. *Aust NZ J Psychiatry* 2007;**41**:442—9.
16. Huppert JD, Weiss KA, Lim R, Pratt S, Smith TE. Quality of life in schizophrenia: contributions of anxiety and depression. *Schizophr Res* 2001;**51**:171—80.
17. Wetherell JL, Palmer BW, Thorp SR, Patterson TL, Golshan S, Jeste DV. Anxiety symptoms and quality of life in middle-aged and older outpatients with schizophrenia and schizoaffective disorder. *J Clin Psychiatry* 2003;**64**:1476—82.
18. Reine G, Simeoni MC, Auquier P, Loundou A, Aghababian V, Lancon C. Assessing health-related quality of life in patients suffering from schizophrenia: a comparison of instruments. *Eur Psychiatry* 2005;**20**:510—9.
19. Reine G, Lancon C, Di Tucci S, Sapin C, Auquier P. Depression and subjective quality of life in chronic phase schizophrenic patients. *Acta Psychiatr Scand* 2003;**108**:297—303.
20. Karow A, Moritz S, Lambert M, Schoder S, Krausz M. PANSS syndromes and quality of life in schizophrenia. *Psychopathol* 2005;**38**:320—6.
21. Narvaez JM, Twamley EW, McKibbin CL, Heaton RK, Patterson TL. Subjective and objective quality of life in schizophrenia. *Schizophr Res* 2008;**98**:201—8.
22. Folsom DP, Depp C, Palmer BW, Mausbach BT, Golshan S, Fellows I, et al. Physical and mental health-related quality of life among older people with schizophrenia. *Schizophr Res* 2009;**108**:207—13.
23. Cook PE, Goldberg JO, Van Lieshout RJ. Benefits of switching from typical to atypical antipsychotic medications: a longitudinal study in a community-based setting. *Can J Psychiatry* 2002;**47**:870—4.
24. Bozikas VP, Kosmidis MH, Kafantari A, Gamvrula K, Vasiliadou E, Petrikis P, et al. Community dysfunction in schizophrenia: rate-limiting factors. *Prog Neuropsychopharmacol Biol Psychiatry* 2006;**30**:463—70.
25. Smith TE, Hull JW, Goodman M, Hedayat-Harris A, Willson DF, Israel LM, et al. The relative influences of symptoms, insight, and neurocognition on social adjustment in schizophrenia and schizoaffective disorder. *J Nerv Ment Dis* 1999;**187**:102—8.
26. Kao YC, Liu YP, Chou MK, Cheng TH. Subjective quality of life in patients with chronic schizophrenia: relationships between psychosocial and clinical characteristics. *Compr Psychiatry* 2011;**52**:171—80.
27. Malakouti SK, Nojomi M, Panaghi L, Chimeh N, Mottaghipour Y, Joghatai MT, et al. Case-management for patients with schizophrenia in Iran: a comparative study of the clinical outcomes of mental health workers and consumers' family members as case managers. *Community Ment Health J* 2009; **45**:447—52.
28. Dieterich M, Irving CB, Park B, Marshall M. Intensive case management for severe mental illness. *Cochrane Database Syst Rev* 2010. CD007906.
29. Burns T, Catty J, Dash M, Roberts C, Lockwood A, Marshall M. Use of intensive case management to reduce time in hospital in people with severe mental illness: systematic review and meta-regression. *Br Med J* 2007;**335**:336.
30. Kay SR, Opler LA, Lindenmayer JP. Reliability and validity of the positive and negative syndrome scale for schizophrenics. *Psychiatry Res* 1988;**23**:99—110.
31. König HH, Roick C, Angermeyer MC. Validity of the EQ-5D in assessing and valuing health status in patients with schizophrenic, schizotypal or delusional disorders. *Eur Psychiatry* 2007;**22**:177—87.
32. Prieto L, Novick D, Sacristan JA, Edgell ET, Alonso J. A Rasch model analysis to test the cross-cultural validity of the EuroQoL-5D in the Schizophrenia Outpatient Health Outcomes Study. *Acta Psychiatr Scand Suppl* 2003:24—9.
33. Prieto L, Sacristan JA, Hormaechea JA, Casado A, Badia X, Gomez JC. Psychometric validation of a generic health-related quality of life measure (EQ-5D) in a sample of schizophrenic patients. *Curr Med Res Opin* 2004;**20**:827—35.
34. Chang TJ, Tarn YH, Hsieh CL, Liou WS, Shaw JW, Chiou XG. Taiwanese version of the EQ-5D: validation in a representative sample of the Taiwanese population. *J Formos Med Assoc* 2007;**106**:1023—31.

35. Killaspy H, Bebbington P, Blizard R, Johnson S, Nolan F, Pilling S, et al. The REACT study: randomised evaluation of assertive community treatment in north London. *Br Med J* 2006;**332**:815—20.
36. Burns T, Creed F, Fahy T, Thompson S, Tyrer P, White I. Intensive versus standard case management for severe psychotic illness: a randomised trial. UK 700 Group. *Lancet* 1999;**353**:2185—9.
37. Burns T, Fiander M, Kent A, Ukoumunne OC, Byford S, Fahy T, et al. Effects of case-load size on the process of care of patients with severe psychotic illness. Report from the UK700 trial. *Br J Psychiatry* 2000;**177**:427—33.
38. Thornicroft G, Tansella M. Components of a modern mental health service: a pragmatic balance of community and hospital care: overview of systematic evidence. *Br J Psychiatry* 2004; **185**:283—90.
39. Saarni SI, Viertio S, Perala J, Koskinen S, Lonnqvist J, Suvisaari J. Quality of life of people with schizophrenia, bipolar disorder and other psychotic disorders. *Br J Psychiatry* 2010;**197**:386—94.